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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,503	09/15/2003	Michael J. Rocke	80107.079US1	9215

7590 07/28/2006

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Minneapolis, MN 55402

EXAMINER	
ALEJANDRO, RAYMOND	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 07/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/662,503	ROCKE ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 17-33* is/are pending in the application.

4a) Of the above claim(s) *1-14 and 25-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15 and 17-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07/12/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *IDS 07/10/06 (DUPLICATE)*.

DETAILED ACTION

Response to Amendment

The following document is being offered in response to applicant's reply dated 07/12/06. Applicant has overcome the objections. However, neither the 35 USC 102 rejection nor the 35 USC 103 rejections have been overcome. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments and remarks. However, the present claims are finally rejected over the same applied art as seen hereinbelow and for the reasons of record:

Election/Restrictions (Claim Disposition)

1. Claims 1-14 and 25-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 03/16/06.

2. Claim 16 has been cancelled.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 07/10/06 was considered by the examiner. An IDS dated 07/12/06 is a duplicate of the 07/10/06 IDS. A copy of the 07/12/06 IDS is being included herewith as well.

Drawings

4. The drawings were received on 07/12/06. These drawings are acceptable.

Double Patenting

Note: Applicant has agreed to file a terminal disclaimer if claims in the instant application are found allowable. See 07/12/06 amendment at page 9.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 15-24 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4, 8-11 and 13-19 of copending Application No. 10/662561 (***US Patent Application Publication 2005/0058867***). Although the conflicting claims are not identical, they are not patentably distinct from each other because:

The copending application'561 claims the following (CLAIMS 1-4, 8-11 and 13-19):

1. An apparatus comprising:

a fuel cell;

an integrated circuit; and

a cooling system to cool the fuel cell and the integrated circuit;

wherein the cooling system includes a fluid medium to remove heat from the fuel cell and the integrated circuit.

2. The apparatus of claim 1 wherein the fuel cell includes at least one electrode through which the fluid medium passes.

3. The apparatus of claim 1 further comprising a pump to pump the fluid medium.

4. The apparatus of claim 1 further comprising at least one temperature sensor.

8. The apparatus of claim 4 further comprising a control system adapted to modify a power output level of the fuel cell in response to a temperature sensed by the temperature sensor.

9. The apparatus of claim 1 wherein the integrated circuit comprises a processor.

11. The apparatus of claim 1 wherein the fluid medium comprises a liquid metal.

13. An apparatus comprising:

a fuel cell having an electrode with passageways through which a fluid cooling medium can pass; and

a fluid path adapted to be coupled to the passageways and to a heat generating device other than the fuel cell.

14. The apparatus of claim 13 further comprising a pump coupled to the electrode, the pump configured to pump the fluid cooling medium through the passageways.

15. The apparatus of claim 13 further comprising an integrated circuit coupled to the fluid path.

16. The apparatus of claim 15 wherein the integrated circuit comprises a graphics circuit.

17. The apparatus of claim 15 wherein the integrated circuit comprises a processor.

18. The apparatus of claim 13 further comprising a temperature sensor.

19. The apparatus of claim 18 further comprising a control system to increase the fuel cell output when a temperature sensed by the temperature sensor drops.

In this case, the claims of the copending application '561 fully encompass the subject matter of the present invention. Additionally, combinations of one claim of the copending application '561 with another claim thereof represent obvious variations of the present invention.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 15 and 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Stedman et al 3704172.

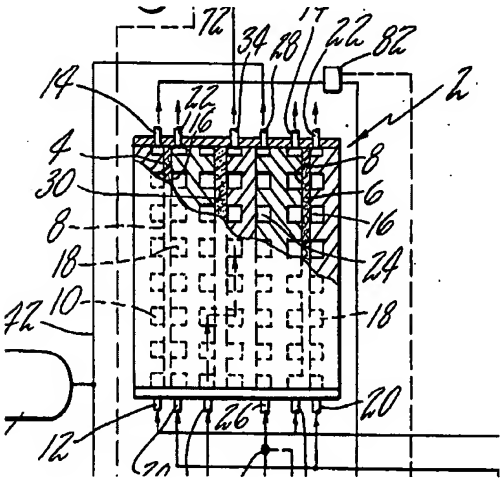
The present claims are directed to an apparatus wherein the disclosed inventive concept comprises the specific electrode with the fluid passage.

As to claim 15:

Stedman et al disclose a dual mode fuel cell system (TITLE) including a fuel cell 6, anodes 8 and cathodes 16 (COL 2, lines 35-37). Enlarged portion of **Figure 1** below illustrates these features.

Stedman et al disclose that the fuel cell includes coolant liquid passage 24 having an inlet 26 and an outlet 28 for closed cycle mode operation cooling of the fuel cell power section; and evaporative cooling means 30 having a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling thereof (COL 2, lines 67-72).

As evident from the Figure below, coolant liquid passage 24 and evaporative cooling means 30 are disposed in the opposite side of reactive channels. *Thus, the electrodes have fluid passages through which a fluid cooling medium can pass.*



Stedman et al disclose heat exchange means 46 which may be a radiator (COL 3, lines 10-15); and condenser 56 (COL 3, lines 23-27); and evaporative cooling means (COL 2, lines 70-72). In addition to that, of particular interest is the teaching that Stedman et al encompass closed cycle operation cooling (COL 3, lines 3-19/ CLAIM 1); open cycle operation cooling (COL 3, lines 43-64/ CLAIM 1); close cycle electrolyte diluent removal including the use of a

coolant (COL 3, lines 20-42/ CLAIM 1); and open cycle operation electrolyte diluent (COL 3, line 65 to COL 4, line 10/ CLAIM 1). *Hence, the cycle electrolyte loop of Stedman et al also is a cooling medium loop. Thus, it is contended that all of the features above, collectively or in combination, represent the heat generating device.*

(***Emphasis Added→***) Stedman et al use pumps 44 and 58 for pumping coolant (COL 3, lines 10-13 & COL 3, lines 25-27/ CLAIM 2). Additionally, pump means 86 (COL 4, lines 2-5) is used to feed fuel reactant 13 (COL 2, lines 35-40). See also the **sole Figure**.

(***Emphasis Added→***) Stedman et al disclose controlling pumps 44 and 58 in response to the fuel cell temperature by employing sensing means 40 for regulating the flow of coolant (*controller/regulator is implicitly taught*) as a function of the fuel cell temperature so as to maintain the cells at within a predetermined temperature range (COL 3, lines 3-17/CLAIM 2) or temperature sensor 41 operatively connected to control means 45, thereby controlling the temperature of the coolant passing there-through (COL 3, lines 20-42/ CLAIM 2). Specifically, Stedman et al is concerned with controlling or maintaining the correct fuel cell stack operating temperature for optimum cell performance at all required loads and heat sing temperatures (COL 1, lines 43-47 & lines 67-70/COL 3, lines 5-8). Pump means 86 is connected to control means 88 operatively connected to humidity sensing means 82 (COL 4, lines 1-5) being influenced by open cycle operation cooling which is function of a cell temperature (COL 3, lines 43-49).

As to claim 23:

Stedman et al use temperature sensing means 40 and temperature sensor 41 (COL 3, lines 8-10 & COL 3, lines 34-36/CLAIM 2).

As to claim 24:

Stedman et al is concerned with controlling the output of the fuel cell in response to a sensed temperature (COL 3, lines 15-19/ COL 3, lines 39-43).

Thus, the present claims are anticipated.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 15 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stedman et al 3704172 in view of Ballantine et al 2002/0182462.

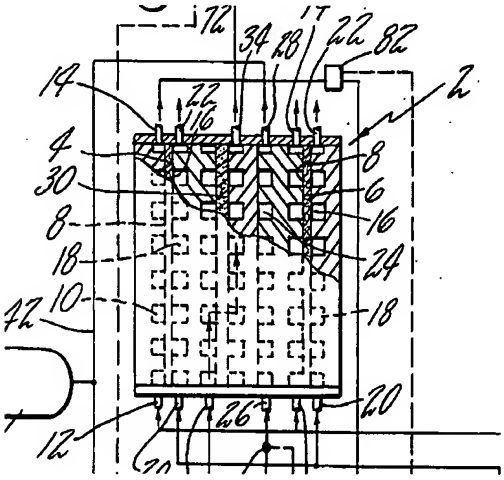
The present claims are directed to an apparatus wherein the disclosed inventive concept comprises the specific electrode with the fluid passage.

<u>As to claim 15:</u>

Stedman et al disclose a dual mode fuel cell system (TITLE) including a fuel cell 6, anodes 8 and cathodes 16 (COL 2, lines 35-37). Enlarged portion of **Figure 1** below illustrates these features.

Stedman et al disclose that the fuel cell includes coolant liquid passage 24 having an inlet 26 and an outlet 28 for closed cycle mode operation cooling of the fuel cell power section; and evaporative cooling means 30 having a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling thereof (COL 2, lines 67-72).

As evident from the Figure below, coolant liquid passage 24 and evaporative cooling means 30 are disposed in the opposite side of reactive channels. *Thus, the electrodes have fluid passages through which a fluid cooling medium can pass.*



Stedman et al disclose heat exchange means 46 which may be a radiator (COL 3, lines 10-15); and condenser 56 (COL 3, lines 23-27); and evaporative cooling means (COL 2, lines 70-72). In addition to that, of particular interest is the teaching that Stedman et al encompass closed cycle operation cooling (COL 3, lines 3-19/ CLAIM 1); open cycle operation cooling (COL 3, lines 43-64/ CLAIM 1); close cycle electrolyte diluent removal including the use of a

coolant (COL 3, lines 20-42/ CLAIM 1); and open cycle operation electrolyte diluent (COL 3, line 65 to COL 4, line 10/ CLAIM 1). *Hence, the cycle electrolyte loop of Stedman et al also is a cooling medium loop. Thus, it is contended that all of the features above, collectively or in combination, represent the heat generating device.*

(***Emphasis Added→***) Stedman et al use pumps 44 and 58 for pumping coolant (COL 3, lines 10-13 & COL 3, lines 25-27/ CLAIM 2). Additionally, pump means 86 (COL 4, lines 2-5) is used to feed fuel reactant 13 (COL 2, lines 35-40). See also the **sole Figure**.

(***Emphasis Added→***) Stedman et al disclose controlling pumps 44 and 58 in response to the fuel cell temperature by employing sensing means 40 for regulating the flow of coolant (*controller/regulator is implicitly taught*) as a function of the fuel cell temperature so as to maintain the cells at within a predetermined temperature range (COL 3, lines 3-17/CLAIM 2) or temperature sensor 41 operatively connected to control means 45, thereby controlling the temperature of the coolant passing there-through (COL 3, lines 20-42/ CLAIM 2). Specifically, Stedman et al is concerned with controlling or maintaining the correct fuel cell stack operating temperature for optimum cell performance at all required loads and heat sing temperatures (COL 1, lines 43-47 & lines 67-70/COL 3, lines 5-8). Pump means 86 is connected to control means 88 operatively connected to humidity sensing means 82 (COL 4, lines 1-5) being influenced by open cycle operation cooling which is function of a cell temperature (COL 3, lines 43-49).

As to claim 23:

Stedman et al use temperature sensing means 40 and temperature sensor 41 (COL 3, lines 8-10 & COL 3, lines 34-36/CLAIM 2).

As to claim 24:

Stedman et al is concerned with controlling the output of the fuel cell in response to a sensed temperature (COL 3, lines 15-19/ COL 3, lines 39-43).

Stedman et al disclose a fuel cell apparatus system in accordance with the aforesaid description. However, Stedman et al does not expressly disclose the specific control system (*this is assuming arguendo that such specific control system is not expressly disclosed by Stedman et al, a point not admitted by the examiner, see rejection supra*).

Ballantine et al disclose an apparatus for controlling a combined heat and power fuel cell system (TITLE/ABSTRACT) which is operated among various modes to balance heat and power demand signals, and include a controller adapted to respond to data signals from the power sink and the heat sink, as examples, such data signals may include a temperature indication or a thermostat signal, or any other electrical signal (ABSTRACT). **Figure 2** is a diagram of integrated fuel cell system including a controller 200 being capable of influencing the operation of components such as the fuel feeding device and the coolant pump or coolant radiator fan in response to variables such as a fuel processor temperature, or oxidizing temperature or system coolant temperature (See **FIGURE 2**).

In light of these disclosures, it would have been obvious to a person possessing a level of ordinary skill in the field of the present invention to use the specific control system of Ballantine et al in the fuel cell system of Stedman et al as Ballantine et al teach that such a control system is capable of accommodating heat and electric power demands in response to instantaneous operational conditions of the fuel cell system so as to prevent abrupt changes. Thus, Ballantine et al's control system provides a more robust and cost effective controlling algorithm for

monitoring the output power of the fuel cell stack, and satisfying the appropriate stoichiometric ratios of reactants therein so as to improve power generation.

7. Claims 17-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Stedman et al 3704172 and/or b) Stedman et al 3704172 in view of Ballantine et al 2002/0182462 as applied to claim 15 above, and further in view of Wang et al 2003/0170515.

Stedman et al and Ballantine et al are applied, argued and incorporated herein for the reasons above.

Stedman et al disclose that the fuel cell includes coolant liquid passage 24 having an inlet 26 and an outlet 28 for closed cycle mode operation cooling of the fuel cell power section; and evaporative cooling means 30 having a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling thereof (COL 2, lines 67-72). As evident from the Figure below, coolant liquid passage 24 and evaporative cooling means 30 are disposed in the opposite side of reactive channels. *Thus, the electrodes have fluid passages through which a fluid cooling medium can pass.*

However, the preceding prior art reference fails to expressly disclose the heat generating device being an integrated circuit.

Wang et al disclose fuel cell system having integrated electronic devices (TITLE) including heat generating electronic devices (ABSTRACT) such as semiconductor integrated circuits including one or more central processor units (CPU), digital signal process (DSP), routers, data storage devices and power amplifiers (CLAIMS 18 & 4); and wireless communication devices (CLAIM 19).

In view of the above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the heat generating device being an integrated circuit of Wang et al in the fuel cell system of Stedman et al and Ballantine et al because Wang et al disclose that the heat generated by the electronic device provides the temperature necessary for fuel processor to convert fuels (P. 0007); thus, the energy required for heating the fuel processor is therefore reduced (P. 0008). Therefore, the energy efficiency is therefore increased (P. 0010). Additionally, the use of Wang et al's heat generating electronic device allows to integrate fuel cell components with electronic devices in a miniature scale (P. 0009). Thus, it represents a reduction in size.

8. Claims 17, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Stedman et al 3704172 and/or b) Stedman et al 3704172 in view of Ballantine et al 2002/0182462 as applied to claim 15 above, and further in view of Jankowksi et al 2004/0048128.

Stedman et al and Ballantine et al are applied, argued and incorporated herein for the reasons above.

Stedman et al disclose that the fuel cell includes coolant liquid passage 24 having an inlet 26 and an outlet 28 for closed cycle mode operation cooling of the fuel cell power section; and evaporative cooling means 30 having a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling thereof (COL 2, lines 67-72). As evident from the Figure below, coolant liquid passage 24 and evaporative cooling means 30 are disposed in the opposite side of reactive

channels. *Thus, the electrodes have fluid passages through which a fluid cooling medium can pass.*

However, the preceding prior art reference fails to expressly disclose the heat generating device being an integrated circuit.

Jankowksi et al teach fuel cells (TITLE/ABSTRAC). Jankowksi et al further discuss that integrated circuit type microfabrication processes are used to pattern the electrode contacts, as well as to form a resistive heater element within the fuel cell stack structure (P. 0031).

In view of the above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the heat generating device being an integrated circuit of Jankowksi et al in the fuel cell system of Stedman et al and Ballantine et al because Jankowksi et al discuss that integrated circuit type microfabrication processes are used to pattern the electrode contacts, as well as to form a resistive heater element within the fuel cell stack structure. Thus, Jankowksi et al readily envision the use of integrated circuit as resistive heater elements within fuel cell stack structure. As is well known in the art, the use of integrated circuit elements allow to reduce the size of devices or apparatus using the same.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Stedman et al 3704172 in view of Wang et al 2003/0170515; and/or b) Stedman et al 3704172 in view of Jankowksi et al 2004/0048128; and/or c) Stedman et al 3704172 in view of Ballantine et al 2002/0182462 in view of Wang et al 2003/0170515 and/or d) Stedman et al 3704172 in view of Ballantine et al 2002/0182462 in view of Wang et al 2003/0170515 as applied to claim 20 above, and further in view of Skala 3911288.

Stedman et al or Stedman et al-Ballantine et al, and Wang et al or Jankowksi et al are applied, argued and incorporated herein for the reasons above. However, none of the preceding references expressly disclose the specific cooling medium comprising the liquid metal.

Skala discloses that alkali metals have been used as a source of energy in heat engines and fuel cell (COL 1, lines 50-57). Disclosed is the use of NaK as a fuel in an oxidative reaction in a fuel cell (Col 2, lines 39-45/CLAIM 14/ COL 4, lines 22-25). It is disclosed that liquid metal NaK releases large amounts of energy when this alloy is reacted with oxidizers (COL 3, lines 20-23); and that direct cooling of the liquid metal is an advantage (COL 3, lines 44-47).

With these teachings, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ the specific cooling medium comprising the liquid metal of Skala in the fuel cell system of Stedman et al-Wang et al and/or Stedman et al-Jankowksi and/or Stedman et al-Ballantine et al-Wang et al and/or Stedman et al-Ballantine et al-Jankowksi et al because Skala discusses that direct cooling of the liquid metal is an advantage over conventional cooling mediums as well as that such liquid metal is capable of releasing large amounts of energy. Thus, liquid metals are suitable cooling medium fluids.

Response to Arguments

10. Applicant's arguments with respect to the foregoing claims have been considered but are moot in view of the new ground(s) of rejection. See item 6 above.

11. Additionally, Applicant's arguments filed s 07/12/06 have been fully considered but they are not persuasive.

12. The gist of applicant's arguments is premised on the assertion that the prior art fails to disclose or teach or suggest "*a control system to influence operation of the fuel pump and coolant pump responsive to a temperature of the fuel cell and a temperature of a processor*". However, the examiner strenuously but respectfully disagrees with the position taken by the applicant. Concerning this matter, the examiner avers that Stedman et al'172 disclose: a dual mode fuel cell system (TITLE) including a fuel cell 6, anodes 8 and cathodes 16 (COL 2, lines 35-37); further includes coolant liquid passage 24 having an inlet 26 and an outlet 28 for closed cycle mode operation cooling of the fuel cell power section; and evaporative cooling means 30 having a liquid inlet 32 and a vapor outlet 34 for open cycle mode operation cooling thereof (COL 2, lines 67-72); further including pumps 44 and 58 for pumping coolant (COL 3, lines 10-13 & COL 3, lines 25-27/ CLAIM 2); and additionally, pump means 86 (COL 4, lines 2-5) is used to feed fuel reactant 13 (COL 2, lines 35-40).

More significantly, of particular interest is Stedman et al'172 teachings about controlling pumps 44 and 58 in response to the fuel cell temperature by employing sensing means 40 for regulating the flow of coolant (*controller/regulator is implicitly taught*) as a function of the fuel cell temperature so as to maintain the cells at within a predetermined temperature range (COL 3, lines 3-17/CLAIM 2) or temperature sensor 41 operatively connected to control means 45, thereby controlling the temperature of the coolant passing there-through (COL 3, lines 20-42/ CLAIM 2). Specifically, Stedman et al is concerned with controlling or maintaining the correct fuel cell stack operating temperature for optimum cell performance at all required loads and heat sing temperatures (COL 1, lines 43-47 & lines 67-70/COL 3, lines 5-8). Pump means 86 is connected to control means 88 operatively connected to humidity sensing means 82 (COL 4,

lines 1-5) being influenced by open cycle operation cooling which is function of a cell temperature (COL 3, lines 43-49).

It should be noted that the limitation "*a temperature of a processor*" is actually a broad limitation potentially encompassing any additional fuel cell component such as the closed or open cycle operation cooling devices, or humidity devices or even pressure associated devices or control means capable of processing/regulating operating conditions. As such, the examiner has given that limitation its broadest reasonable interpretation in view of the prior art as well as its poor definition in the present claims. Also, the specification as filed adds nothing of significance to further delimit or characterize that limitation. Thus, the examiner contends that Stedman et al'172 provides the necessary functional and structural interrelationship to still satisfy all the claimed requirements, specially, the requirement of having the particular control system. Simply put, Stedman et al's control system is fully capable of influencing both the fuel pump and the coolant pump in response to the fuel cell temperature and the temperature of any other feature serving as the processor.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. See item 6 above. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745